ANNUAL REPORT

OF THE

Oregon Agricultural College

AND

Experiment Station

FOR THE YEAR ENDING

JUNE 30, 1900.

AGRICULTURAL COLLEGE PRINTING OFFICE.
GEO. B. KEADY, PRINTER.
1900.

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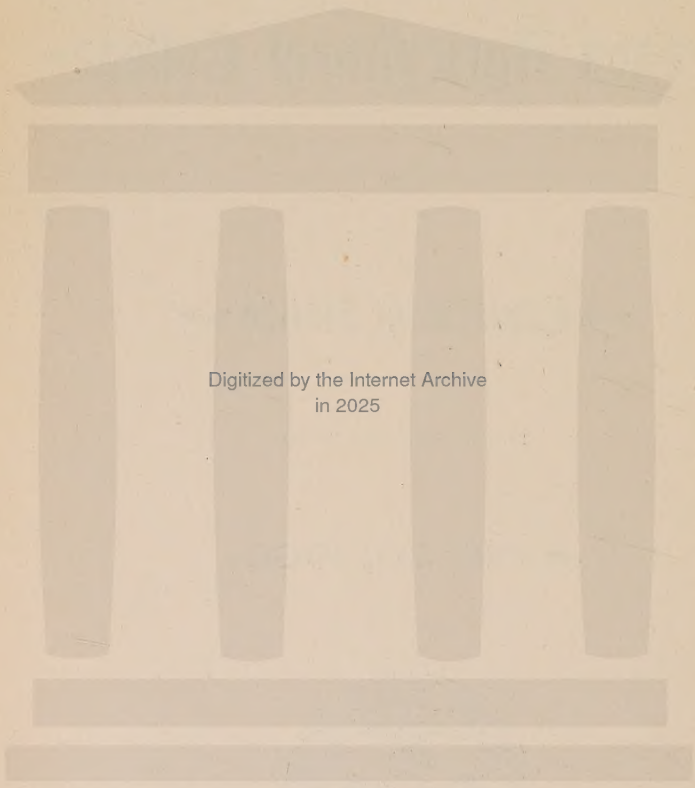

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ANNUAL REPORT

OF THE

OREGON AGRICULTURAL COLLEGE AND EXPERIMENT STATION, 1900.

REPORT OF THE PRESIDENT OF THE BOARD OF REGENTS.

CORVALLIS, Oregon, July 18, 1900.

To His Excellency, T. T. Geer, Governor of Oregon:

SIR:—I have the honor of submitting to you this my annual report of the work of the State Agricultural College and Experiment Station for the year ending June 30, 1900. This is the thirty-first annual report of the work of the College and the eleventh annual report of the Experiment Station.

This has been the most prosperous year in the history of this institution. The enrollment this year has exceeded that of any previous year. This has been a year of wonderful progress in all the branches of the work at this institution. The men immediately in charge of the work at this College and Station are justly entitled to honorable mention for their able and efficient work. They have during this year ably and fully sustained the high and favorable standing of this—"Oregon's great School." President Gatch by his untiring efforts has continued to win honors for this institution and he has ably sustained the high standing and reputation that he has acquired as an educator. He continues to receive the cheerful obedience and support of the members of the College Faculty and the Station Staff. His standing with the employes and students of this institution is of that character that would make any person feel proud. The young people who have been in attendance at this school during the year have so conducted themselves that they are entitled to special commendation. This is creditable to them and honorable to their relatives and friends.

The culture and practical training given at this institution must tend to develop nobler, stronger, and better men and women for the discharge of those duties in life that they may encounter as American citizens. Col. M. P. Maus, Inspector General, U. S. Army, after inspection of the military cadets at this College, made the following statement, clearly indicating the character of this branch of training that is being carried on so ably and well by one of the graduates of this college—Major F. E. Edwards—complimentary to him and reflecting great honor upon this College and the loyalty and patriotism of our people:—"I have examined over 50,000 men but never found in any State institution better drilled cadets than these. We have become a military people; we live in a critical period when new armies of well trained men may be needed at any time. During the late struggle the exigencies were met by many untrained officers who were unfamiliar with the simplest military terms and maneuvers, and knew nothing of sanitation and other measures so important to the health of the troops."

"These cadets, some of whom are able to drill regiments, would be indispensable to the nation in such an emergency. Our people have learned an important lesson."

But little over a month has passed since the above remarks were made and now every loyal citizen must admit that the "critical period" can now be perceived by us all while it is devoutly hoped that some solution, honorable and just, may be found by which war may be avoided. Still it is gratifying to know that Oregon's sons are being so ably equipped for any emergency.

The work of the Experiment Station comes under the immediate supervision of Dr. James Withycombe. He and the members of the Station Staff have ably sustained and supported the Director of the Station. The work of the Station has never been so ably conducted. The Vice-Director is justly entitled to credit and commendation for marked improvement that is manifest in this branch of work. The constant and persistent demands coming from the people and all sections of the State, asking that institutes be held in the different localities and for information as to other experimental work, clearly indicate the great interest that they have in this branch of work. In fact, the entire College and Station force have during the year contributed and assisted by their efforts in promoting the educational work of this College and Station.

IMPROVEMENT.

Since my last report the Mechanical Hall, then being constructed, has been completed. This building is a two story stone structure, tin roof, eighty-three by one hundred and twenty feet, with commodious and well arranged and lighted rooms. It adds greatly to the accommodation and convenience of carrying on the work and has made it possible for us to accommodate the large number of students who have been in attendance this year. There was also constructed and paid for out of the same appropriation a one story, brick Power House and Blacksmith Shop that is equally well adapted for the accommodation of this branch of work. These buildings will stand as a monument of honor and credit to the members of the Legislative Assembly who so generously provided for the replacement of the buildings that were destroyed by fire. A special appropriation of twenty-five thousand dollars ($25,000) was made at the Special Session of the Legislature of Oregon held in 1898. There were filed with the Secretary of State copies of contracts and certificates, showing in detail all expenditures of this money as the same was drawn. At the January meeting of the Board of Regents, the committee of said Board who had charge of the construction of these improvements made a full and complete detailed statement of this work and said report was approved by the Board. I copy the following as a matter of information as to the cost of these buildings:—

"RECAPITULATION.

Original contract with H. M. Eley	$19,213.00
Subsequent, granite, contract	1,200.00
Extras allowed	1,142.45
Power House contract	1,950.00
Cementing Power House	464.00
Architect's fees	1,544.75
Attorneys' fees	25.00
Total	$25,539.20
Demirrage for non-completion of work as per contract	250.00
Actual cost	$25,289.20
Paid by the State out of the appropriation	25,000.00
Leaving a balance unpaid from this fund	$ 289.20

This last named amount has been paid from other funds of this institution and there is no deficit to be met or provided for by the State of Oregon on account of this improvement."

At the last regular session of the Legislative Assembly of the State there was appropriated nineteen thousand three hundred and

thirty-six dollars ($19,336.00) for the purpose of constructing a general steam heating plant suitable, adequate and sufficient to heat the several buildings now in use at the College. Before the contract could be let for the construction of this plant there was a very great increase in the price of all kinds of materials required for the construction of this heating plant. Hence it was found that the Armory and the Girls' Dormitory had to be omitted to enable the Committee not to over run the amount appropriated.

The plant as constructed is ample and adequate to generate the necessary heat for these buildings, as well as those now supplied by adding one more boiler and making the necessary connections.

This plant was completed and has been in operation since October last in the Administration Building, the Mechanical Hall, the Chemical Laboratory, the Green houses and the Horticultural building, and it has given good satisfaction. The following is from the building Committee who had the construction of this plant in charge as made to the Board at their January meeting and approved by them:—

"RECAPITULATION.

Showing the cost of this improvement:—	
Original contract with Cawston & Co.	$15,454.00
Specical contract with McPherson	497.00
Architect's fees, E. H. Lazarus	1,783.97
Fees paid Stevenson, superintendent of construction	583.80
Extras allowed Cawston & Co., $770.00, less $375.00 demurrage, deducted from account for the reason of the failure of the contractor to complete the heating plant within the time specified in contract, difference	395.00
Total cost of the plant	$18,713.77

This last named amount deducted from the appropriation would leave the sum of $622.23 of the amount appropriated—unexpended.

This money was drawn out of the State Treasury on warrants of the Secretary of State only as the same became due on the contracts." Other permanent improvements that have been made during the year and that have been paid for out of other funds of the College in the aggregate will amount to at least eight thousand dollars ($8,000.00.)

In the Administration Building where was located the hot air furnaces,this room was converted into a commodious and convenient Library and Reading room. This proved to be a very desirable change and it relieved one of the main class rooms in this building that can now be used for other purposes.

There has been constructed in the Armory four bowling alleys for the use of the students and employes of the College.

There was erected a galvanized steel tower sixty feet high with a twenty thousand gallon water tank thereon.

A complete system of sewerage has been put in from the several buildings on the College grounds to a connection on Jefferson Street with the sewer of Corvallis leading thence to the Willamette river.

When suitable closets are provided in the buildings and connections made, the sanitary conditions of the College grounds will be greately improved.

There have been erected four silos at the barn for experimental purposes. There have been a number of new gravel walks constructed on the grounds. All of the improvements that have been made are of a permanent character and such as to greatly enhance the value of this public institution. They have added greatly to the comfort and convenience of the employes and students who are residents at the College.

The improvements made this year while they have been great, have only been sufficient and adequate to enable those in charge of the work of this institution to keep pace with the growing demands that are being made upon them at this College and Station.

The following is a correct statement of all money on hand July 1, 1899—the amounts received on account of the several funds, the amounts disbursed therefrom and the balances on hand June 30, 1900—save and except the two funds referred to in this report:

EXPERIMENT STATION FUNDS.

July 1, 1899.	To balance on hand local station funds	$ 1,781.67	
	To receipts from sale of products, &c.	1,104.57	
	Total amount of local station funds	$ 2,884.24	
	Amount received from U. S. Hatch Act, 1887	$15,000.00	
	Total amount of station funds to be accounted for		$17,884.24
	Amount spent, local station funds	$ 497.38	
	Amount expended of Hatch fund	15,000.00	
June 30, 1900.	Balance on hand, local station funds	2,386.86	
			$17,884.24

AGRICULTURAL COLLEGE FUNDS.

July 1, 1899.	To balance on hand, Morrill Act fund	$ 1,531.55	
	To amount received, U. S. Morrill Act, 1890, and refund	25,010.00	
	To amount received from state, act of 1862	12,322.87	
	Total amount of college funds to be accounted for		$38,864.42
	By amount expended during year		38,864.42

SPECIAL STATE FUND, ACT OF 1889.

July 1, 1899.	To amount on hand from last year	$2,975.15	
	Amount received from state, act of 1889	5,000.00	
	Total amount to be accounted for		$7,975.15
	By amount expended during year	$7,520.41	
June 30, 1900.	Amount on hand	454.74	
	Total amount accounted for		$7,975.15

IMPROVEMENT FUNDS.

July 1, 1899.	To amount on hand	$ 157.19	
	To amount from sales on farm, &c.	962.38	
	Total to be accounted for		$1,119.57
	By amount expended during year	$1,004.28	
June 30, 1900.	By balance on hand	115.29	
	Total amount accounted for		$1,119.57

CHEMICAL BREAKAGE FUND.

July 1, 1899.	To balance on hand	$283.42	
	To amount received during year	511.35	
	Total amount to be accounted for		$794.77
	By amount expended during year	$397.99	
June 30, 1900.	By amount on hand	396.78	
	Total amount accounted for		$794.77

INSURANCE FUNDS.

July 1, 1899.	To balance on hand as per last report	$1,613.24	
	By amount expended during year	1,613.24	

This is a correct statement of the balances on hand at the commencement of the year, the amount received during year of the several funds and the disbursements made during the year, with balances, $3,353.67, remaining on hand, distributed as follows:

	Local station fund	$2,386.86
	Special state act, 1889	454.74
	Improvement	115.29
	Chemical breakage	396.78
June 30, 1900.	Total amount of balances on hand	$3,353.67

For a more full and detailed statement of the finances of this institution, I herewith submit a copy of the report of the Treasurer of the Board of Regents for the year ending June 30, 1900.

There is submitted also a copy of the reports of the President of the College and Director of the Station, with the reports of the Vice-Director and the heads of the Departments of the College and Station, showing in detail the condition and work of this public institution for the year just closed.

If the ratio of increase of attendance during the coming two years equals that of this year, it would give this school at that time about six hundred enrolled pupils. This would probably be the limit of students that it seems possible that can be accommodated at this institution without additional room.

The fact is that in the near future, an additional building will have to be provided for. The Agricultural and Chemical Departments are each illy provided for. This is especially true as to the Chemical Department.

It is inadequate to accomodate the present large number of scholars in attendance. A building similar to the new Mechanical Hall properly arranged in the various rooms with a view of adapting it to these departments would accommodate both of these branches of work and would greatly relieve the main College building. This would give ample room to accommodate at least one thousand scholars.

It is very desirable that better Greenhouse facilities should be provided for. When considering the construction of the heating plant, it was hoped that this improvement could be secured in conjunction therewith. It was found on submitting the plans for bids that it was out of the question and keep the expense within the appropriation. Provision was made so the improvement can be added at some future time when the necessary money is available.

The question of the construction of the necessary closets in the several College buildings and their connection with the sewerage system should be provided for as soon as possible.

An additional water supply is greatly needed. The improvement of the College grounds requires attention and should be attended to as soon as the necessary means are available. The Girls' Dormitory and Cauthorn Hall is each greatly in need of being repainted to properly preserve them.

This report completes the twelfth annual chapter in the history of the Peoples' school, since coming under the control of the Board of Regents of the State Agricultural College of the State of Oregon.

Having had connection with this Board since its organization, it is a matter of satisfaction and pleasure to me to present the foregoing statements of this year's work of the College and Station.

Respectfully submitted,

J. T. APPERSON,

President of the Board of Regents.

TREASURER'S REPORT.

CORVALLIS, Oregon, July 18, 1900.

The Honorable the Board of Regents, Oregon Agricultural College:

GENTLEMEN:—Herewith I submit my report for the year ending June 30, 1900. The vouchers and other evidence of payment are on file in the office of the Clerk and Purchasing Agent.

Very respectfully,

B. F. IRVINE, Treasurer.

TREASURER'S REPORT.

Year Ending June 30, 1900.

BALANCES ON HAND JULY 1, 1899.

Station	$	
College	1,531.55	
State interest, overdraft		$2,226.78
Improvement	157.19	
Chemical breakage	283.42	
Local station	1,781.67	
Insurance	1,613.24	
Special	2,975.15	
		$8,342.22

INCOME FOR THE YEAR.

Station	$15,000.00	
College	25,010.00	
State interest	12,322.87	
Improvement	962.38	
Chemical breakage	511.35	
Local station	1,102.57	
Special	5,000.00	
Mechanical hall	8,416.05	
Heating plant	18,877.02	
		$87,202.24
Total		$95,544.46
Less overdraft on state interest		2,226.78
Total available funds		$93,317.68

DISBURSEMENTS.

Station	$15,000.00	
College	26,541.55	
State interest	10,096.09	
Improvement	1,004.28	
Chemical breakage	397.99	
Local station	1,640.17	
Special	7,520.41	
Mechanical hall	8,416.05	
Heating plant	18,877.02	
Insurance	1,613.24	
		$91,106.80
Less transfer from local station for city sewer		1,142.79
Actual expenditures		$89,964.01
Balance on hand		$ 3,353.67

BALANCES BY FUNDS.

Improvement	$ 115.29	
Chemical breakage	396.78	
Local station	2,386.86	
Special	454.74	
		$ 3,353.67

MISCELLANEOUS RECEIPTS AND THEIR DISTRIBUTION.

Source.	Amount.	Local Station.	Improvement.
Agriculture	$ 974.48	$ 708.80	$265.68
Dairy	352.51	220.15	132.36
Prune experiment	146.05	146.05	-------
Horticulture	17.35	10.87	6.48
Miscellaneous	574.56	16.70	557.86
Total	$2,064.95	$1,102.57	$962.38

DISBURSEMENTS BY DEPARTMENTS AND ITEMS.

Printing	$ 2,325.02	Advertising	$ 205.45
Agriculture	5,747.25	Fuel	2,290.98
Horticulture	2,918.80	Insurance	726.65
Botany	1,590.29	Care of grounds	180.19
Chemistry	4,405.83	Library	1,728.49
Chemical breakage	397.99	Buildings, station	228.91
Photography and drawing	1,852.40	Postage	403.70
Entomology	2,263.06	Freight	401.95
Mechanics	4,663.06	Scientific apparatus	558.42
Household Economy	2,005.27	Machinery	1,061.17
Military	55.73	Administration building	1,604.88
Salaries outside departments	15,574.30	Building repairs, general	788.00
Sanitary	234.50	City sewer	1,959.60
Furniture	17.50	Water tank	1,318.83
Traveling expenses	611.35	Miscellaneous	2,938.63
		Total	$61,057.70

OTHER DISBURSEMENTS.

Insurance	$ 1,613.24	
Mechanical hall	8,416.05	
Heating plant	18,877.02	
		$28,906.31
Total, all disbursements		$89,964.01

FACE OF LEDGER—JUNE 30, 1900.

	Dr.	Cr.	Balance.
Station	$15,000.00	$15,000.00	$ 000.00
College	26,541.55	26,541.55	000.00
State interest	12,322.87	12,322.87	000.00
Improvement	1,119.57	1,004.28	115.29
Chemical breakage	794.77	397.99	396.78
Special	7,975.15	7,520.41	454.74
Local station	4,027.03	1,640.17	2,386.86
Insurance	1,613.24	1,613.24	000.00
Mechanical hall	8,416.05	8,416.05	000.00
Heating plant	18,877.02	18,877.02	000.00
Totals	$96,687.25	$93,333.58	$3,353.67

B. F. IRVINE, Treasurer.

CORVALLIS, Oregon, July 18, 1900.

REPORT OF THE DIRECTOR.

To the Honorable Board of Regents of the Oregon Agricultural College and Experiment Station:

GENTLEMEN:—For information concerning our experimental work for the past year I beg leave to refer you to the accompanying reports of the Vice-Director and Agriculturist, and other members of the Station Council.

The Farmers' Short Course, though not so largely attended as that of the preceding year, was, in many respects, more successful. The course was thoroughly systematized and the organization made perfect by the Vice-Director. The students were interested and, although the attendance was voluntary, they were about as prompt and punctual as were the students of other departments where attendance was compulsory, nor did they interfere in the least with the work of the other departments. Forty-five students were enrolled.

The Station has issued four regular bulletins, three press bulletins and eight weather bulletins.

Several special lectures on diversified agriculture, dairying and kindred subjects have been given in different parts of the country. It is estimated that at least 700 people have attended these lectures.

Twelve farmers' institutes have been held attended by 1650 persons. For the cost of these institutes $379.63 was appropriated from the local station fund and $96.95 from the Hatch fund, making a total of $476.58.

The farmers' institute is an excellent medium for the dissemination of knowledge among the people and, incidentally, for calling attention to the advantages afforded by our college.

Accompanying find a statement of account.

Respectfully submitted,

THOS. M. GATCH, Director.

July 18, 1900.

FINANCIAL ACCOUNT.

Oregon Agricultural Experiment Station, in account with United States Appropriation, 1899–1900.

DR.

To receipts from the Treasurer of the United States as per appropriation for fiscal year ending June 30, 1900, as per Act of Congress approved March 2, 1887	$15,000.00

CR.

By Salaries	$ 8,979.60	
Labor	3,323.82	
Publications	230.98	
Postage and stationery	39.55	
Freight and express	166.58	
Heat, light, and water		
Chemical supplies	457.06	
Seeds, plants, and sundry supplies	305.33	
Fertilizers	6.60	
Feeding stuffs	51.15	
Library	156.41	
Tools, implements, and machinery	406.48	
Furniture and fixtures		
Scientific apparatus	138.93	
Live stock	91.35	
Traveling expenses	96.95	
Contingent expenses	324.95	
Buildings and repairs	224.26	
Total		$15,000.00

SUPPLEMENTARY REPORT.

Local Station Fund.

Balance on hand July 1, 1899	$ 1,781.67	
Received from sales of farm products, etc	1,102.57	
		$ 2,884.24

Disbursements.

Freight	$ 4.25	
Sundry supplies	30.85	
Live stock	20.00	
Traveling expenses	379.63	
Contingent	5.00	
Silos	57.65	
Balance on hand June 30, 1900	2,386.86	
		$ 2,884.24

REPORT OF THE PRESIDENT.

To the Honorable Board of Regents of the Oregon Agricultural College:

GENTLEMEN:— Herewith I present my report for the collegiate year 1899–1900.

ATTENDANCE.

During the year there have been enrolled the names of 405 students, being 67 more than were enrolled last year. We cannot always estimate the worth of a school by the number of students, still, the increase for the year is encouraging. When we consider the large expenditure the Board has made for buildings and other facilities it may be doubted whether the increase is as large as it should be. During the coming year we ought to enroll 500 students. Indeed, we confidently expect to reach that number.

ATTENDANCE BY COUNTIES.

Benton 158; Marion 37; Polk 29; Clackamas 21; Linn 20; Washington 17; Yamhill 15; Lane 12; Multnomah 12; Josephine 4; Lincoln 4; Crook 3; Lake 3; Wheeler 3; Tillamook 2; Wallowa 2; Baker 1; Jackson 1; Douglas 11; Malheur 10; Clatsop 8; Wasco 7; Gilliam 6; Union 6; Coos 4; Sherman 1; Umatilla 1; State of Washington 4; State of California 1; State of South Dakota 1; Alaska 1. Total 405.

The large number from Benton is accounted for in part by the fact that many families move here to educate their children and thereafter consider Corvallis their home.

THE BOARDING HALLS.

Cauthorn Hall, for men, has had a prosperous year under the management of Prof. J. B. Horner. The average cost of living for each student has been $2.28 a week. The house, though sadly in need of paint, is in much better repair than it was a year ago. Accompanying will be found a full report from the Professor in charge. It is desirable that the same management be continued through the coming year.

Several young women have found the usual cheerful home with Miss Snell.

Accompanying you will find in tabular form full information respecting classes, and the work of each instructor for the past year. I append also a schedule of salaries paid the Professors and employes of the college.

Following is a copy of my report to the Secretary of the Interior and the Secretary of Agriculture, as required by act of Congress of August 30, 1890, in aid of Colleges of Agriculture and the Mechanic Arts.

Respectfully submitted,

THOS. M. GATCH, President.

July 18, 1900.

OREGON AGRICULTURAL COLLEGE,

CORVALLIS, OREGON.

Report of the President of said institution to the Secretary of the Interior and the Secretary of Agriculture, as required by act of Congress of August 30, 1890, in aid of Colleges of Agriculture and the Mechanic Arts.

I. Condition and Progress of the Institution for the year ended June 30, 1900, especially—

(1) Changes in course or methods of instruction if of sufficient importance to warrant mention, and (2) purpose, structural character, and cost of new buildings or additions to buildings.

2. The Mechanical Hall has been completed at an additional cost of $8,416.05.

A Heating Plant—steam—has been put in at a cost of $18,877.02.

What, if anything, has been done during the year by your institution in farmers' institute work?

"During the past year, twelve farmers' institutes have been held under the auspices of the station with a total attendance of 1,650 persons. In addition to regular institutes, seven special lectures on dairying and diversified agriculture have been given with a total attendance of 700 persons."—*Extract from report of Dr. James Withycombe, Vice-Director of station, 1899-1900.*

II. Receipts for and During the year ended June 30, 1900.

1. Balance on hand July 1, 1899, over and above all indebtedness (excluding funded debt, if any)	$ 6,115.44
2. State aid: (*a*) Income from endowment granted by State	
(*b*) Appropriation for current expenses, special	5,000.00
(*c*) Appropriations for building or for other special purposes	27,293.07
3. Federal aid: (*a*) Income from land grant, act of July 2, 1862	12,322.87
(*b*) Additional endowment act of August 30, 1890	25,000.00
(*c*) For experiment stations, act of March 2, 1887	15,000.00
4. Fees and all other sources	2,576.30
Total	$93,307.68

III. Expenditures for and During the year ended June 30, 1900.

1. Instruction in the subjects specified in sec. 1, act of August 30, 1890	$26,541.55
2. Instruction in all other subjects, if any, not mentioned in Question 1 of this series	
3. Administrative expenses (President's, Secretary's, Treasurer's, Librarian's salary, clerical service, fuel, light, etc.)	22,858.79
4. Experiment Station	15,497.38
Total	$64,897.72

IV. Property, Year Ended June 30, 1900.

Value of all buildings, $94,000; of other equipment, $18,500.
Value of above property not used for instruction in the subjects specified in section 1 of act of August 30, 1890, buildings, $49,000; of other equipment, $3,000.
Total number of acres, 198.91; acres under cultivation, 125; acres used for experiments, 25; value of farm lands, $15,000; amount of all endowment funds, none.
Number of bound volumes, June 30, 1900, 3,000; pamphlets, unknown.

V. Faculty during the year ended June 30, 1900.

	MALE.	FEMALE.
1. College of Agriculture and Mechanic Arts:		
(*a*) Preparatory classes	4	2
(*b*) Collegiate and special classes	21	6
(*c*) Total, counting none twice	22	6
2. Number in all other departments		
3. Number of staff of Experiment Station	11	1

VI. Students during the year ended June 30, 1900.

	MALE.	FEMALE.
1. College of Agriculture and Mechanic Arts:		
(*a*) Preparatory classes	33	9
(*b*) Collegiate and special classes	207	137
(*c*) Post Graduate courses	8	11
Total	248	157
2. Number in all other departments		

3. Number of students that pursued courses in agriculture, 48; mechanical engineering, 99; civil engineering, none; electrical engineering, 6; mining engineering, none; architecture, none; household economy, 96; veterinary science, none; dairying, none; military tactics, 240.
4. What degrees and how many of each kind were conferred in 1899–1900—
   On men—B. S. on 23 men; M. S. on one man.
   On women—B. S. on 12 women.
5. What and how many honorary degrees were conferred in 1899–1900, none.

(Signed:) THOS. M. GATCH, President.

June 30, 1900.

REPORT OF VICE-DIRECTOR AND AGRICULTURIST.

Director T. M. Gatch, Oregon Experiment Station:

DEAR SIR:—I beg to submit the following report of the Agricultural Department for the year ending June 30, 1900:

PLANT HUSBANDRY.

Many new varieties of grasses and cereals, both foreign and domestic have been secured the past year for the purpose of testing their adaptability to conditions here.

Among the large number of cereals, leguminous plants and grasses which have been tested at this station, we find that comparatively few possess any economic value for the farmers of western Oregon. The growing of those found not adapted to the climatic and soil conditions here has been discontinued; while those giving indications of value have been grown upon a larger scale, with varying cultural methods, to determine their value under dissimilar conditions.

Several new varieties of foreign hops have been introduced which are reported to be rich in lupulin, and to mature early and medium early.

The Cascade chain of mountains divides this State into two distinct agricultural sections, possessing well marked differences both in climate and soil. The district east of the mountains is an arid or semi-arid region, of volcanic formation. While the section west of them is a humid district of alluvial or sedimentary formation. Owing to the different conditions of climate and soil the experiments made with cereals and forage plants at this station are practically of little value to agricultural interests of the eastern section of this State.

This region presents a large opportunity for experimental and research work along the lines of economic forage plants.

Four experimental plats comprising one-fourth acre each were established at Moro, Sherman county, in the spring of 1899. Upon these plats leguminous plants, consisting of the Canadian field pea and two varieties of vetch, Vicia Villosa and Vicia Sativa, have been grown as rotation crops with grain for the past two seasons. The pea has given very satisfactory results, but the vetch so far has been a partial failure. The object of these experiments is to deter-

mine whether or not humus-forming and nitrogen-gathering forage plants, valuable for stock food, can be successfully grown as rotation crops with grain. In connection with the growing of these plants, samples of soil from each of the plats are received weekly during the growing season at the chemical department of this station for the purpose of making moisture determinations. Moisture is always an important factor in an arid or semi-arid region, hence any class of valuable forage plants which will improve the moisture-bearing qualities of the soil, or methods of husbandry which will conserve this constituent is of more than ordinary importance to the farmer.

In view of the immense agricultural interests of this section, and the well-known tendencies of the present agricultural practices to cause deterioration in the ultimate productiveness of the farms, as well as the complete or partial devastation of immense pastoral regions, I would respectfully suggest that an effort be made to cooperate with the Department of Agriculture, or to secure a State appropriation for the establishment of an experimental farm for the purpose of testing various grasses and other forage plants, so that their value when grown under semi-arid conditions may be determined. This section also offers a large field for experiments with grasses in testing their qualities for sand binding, and for reclaiming denuded areas where irrigation is impracticable. The matter of selection and the breeding up of grasses and other forage plants to meet the peculiar requirements of this section is worthy of serious thought.

ANIMAL HUSBANDRY.

The experimental feeding of swine has been continued. This consisted of feeding peas, wheat and potatoes as fattening food; also the pasturing of clover, to determine the value of this plant as a swine food.

Depasturing winter wheat with sheep.

Pasturing sheep on vetch and rape, sown as a substitute for the bare summer fallow.

Feeding peas to cows to determine their value as a protein constituent of a ration. Owing to our inability to have them ground they were fed whole, but with unsatisfactory results.

Soiling dairy cows with the result that one acre of green crimson clover and vetch gave a net return of $42.83.

SOIL EXPERIMENTS.

Blasting of land with dynamite to determine if this method is a feasible substitute for subsoil plowing. Grain sown on land thus treated has a better appearance at present than that on similar land not treated.

MISCELLANEOUS WORK.

Continuation of the experiment with thick, medium and thin sowing of wheat.

Experiment with nitrate of soda on spring sown oats and barley.

Experiments with leguminous crops for silage. For this work four stave silos have been constructed, three of which are filled with clover put in under different conditions with a view of determining if possible the best method for ensilaging this crop. The other silo will be filled with peas.

We are desirous of securing data as to the practicability of ensilaging leguminous plants, as the growing of such crops will have a highly beneficial effect on the soil. And if they can be preserved in a successful form as silage, it will furnish the stock feeder, and dairyman with an inexpensive but valuable form of protein in an assimilable condition.

FARMERS' INSTITUTES.

During the past year 12 farmers' institutes have been held under the auspices of the station with a total attendance of about 1,650 persons. In addition to regular institutes, seven special lectures on dairying and diversified agriculture have been given with a total attendance of about 700 persons.

It is gratifying to note the increased interest taken in this work by our farmers. These institutes are exceedingly helpful both to the farmer and to the Experiment Station worker. While the station is ever ready to accede to the desires of the farmer for information along the different lines of husbandry, we find it growing annually more difficult to comply with the farmers' request for more institutes, owing to the constant increase in the work of the station.

This field of work is so important to our agriculturists as to warrant an especial appropriation being made by the State for its extension.

SEED DISTRIBUTION.

One hundred and twenty-seven packages of seed, principally of leguminous plants, have been sent out by the station during the past year.

Receipts from sales of stock, farm and dairy products during the year, $1,326.99.

ACKNOWLEDGMENTS.

The station feels under special obligations to the Secretary of Agriculture, Hon. James Wilson, for the valuable assistance he has given us in securing plants and seeds; also to the Southern Pacific, Oregon Railway and Navigation Company, Northern Pacific and Corvallis and Eastern Railroad Companies for their kindly assistance in transportation, thus enabling us to accomplish a large amount of field work at a minium expense to the station.

We also take this means of expressing our appreciation to all those who so kindly co-operated with the station in testing forage plants in various sections of the State.

Very respectfully submitted,

JAMES WITHYCOMBE.

REPORT OF THE CHEMIST.

Dr. T. M. Gatch, Director of Oregon Experiment Station:

DEAR SIR:—I have the honor to submit the following brief report of work done in the chemical department of the station during the year ending with the date of this report.

The conditions which have prevailed during the year rendered it unwise to undertake any new continued work, but the time was devoted to clearing up a number of miscellaneous lines which were unfinished, and the calculation of data on finished work, which together with the analyses made for the State Dairy and Food Commissioner and the necessary class instruction required all of my time.

During the fall experiments were conducted in connection with the horticulturist, Professor Lake, on the curing of prunes, attempts being made by means of anemometric and hygrometric measurements to ascertain something definite as to the amount of air moving at a known rate at a known temperature under the prevailing

conditions to cure a ton of prunes, also to obtain some data concerning the humidity of both entering and exit air. This experiment was considered as only preliminary to more exhaustive work, to gain some idea as to the more important difficulties which might be encountered. While the condition of the fruit received was such as to render the figures of doubtful value, yet the work was of value in indicating some of the more important to be observed in conducting future work. The data obtained relative to the air currents and temperature were turned over to the horticultural department for future reference.

SORGHUM.

On the completion of the work with sugar beets (1898) plans were laid to investigate the possibilities of growing sorghum for syrup-making in certain parts of the state. The work was begun in the spring of 1899, during which season a quantity of seed was distributed in the state, especially in Jackson and Umatilla counties, where it was thought the conditions would be most suitable for the crop. In each of these counties sorghum had been grown on a very limited scale for a number of years and a crude syrup had been made for home use. No attempt had ever been made, so far as known to the writer, to ascertain the real quality of the cane as compared with that produced elsewhere. The seed employed in these experiments consisted of Minnesota Early Amber cane, purchased of Mr. Seth Kinney, Morristown, Minn., and the following varieties of pedigreed southern grown seed furnished by the U. S. Department of Agriculture: Early Amber, Brown Colman, and Folger's Early.

None of the southern grown varieties matured, but the Minnesota seed seemed quite well adapted to the Oregon conditions. The season was altogether unfavorable for the experiment and for one reason and another of the 79 to whom seed was sent, 51 failed to forward samples. In most of these cases the cane was killed by a quite general frost which occurred on or about October 2d in both eastern and southern Oregon, which is quite an unusual occurrence so early in the season, especially in Jackson county. The results of the analyses of the canes are presented below.

Laboratory No.	Grower.	Postoffice.	Planted.	Cut.	Longest stalk, feet.	Shortest stalk, feet.	Was season favorable?	Analyses of juice.				
								Sucrose	Glucose	Total sugar	Purity	Total solids
1801	Lee Watkins	Central Point	April 25	September 30				16.8	8.7	25.5	66.9	25.1
1803	S. L. Bennett	Medford	April 25	October 3	8	5½	No	15.4	4.6	20.0	73.0	21.0
1804	I. A. Merriman	Medford	April 19	October 3	7½	4½	No	9.0	3.9	12.9	41.0	19.4
1805	T. B. Johns	Galevill						13.4	4.2	17.6	63.0	18.1
1806	E. H. Davis	Table Rock	April 15	October 3	9½	5½	Yes	12.2	4.6	16.8	50.0	19.5
1808	Isaac Wolf	Medford	April 15	October 4	6	4	No	11.0	6.2	17.2	46.0	23.9
1809	J. W. Smith	Eagle Point	May 10	October 6	8⅞	5	No	13.0	5.5	18.5	63.4	20.5
1810	E. H. Lennox	Brockway	May 1	October 6	8½	6	Yes	13.7	4.6	18.3	67.0	21.0
1814	Thos. McAndrews	Medford	May 15	October 9			Fair	14.6	4.2	18.8	71.5	19.7
1815	E. A. Hendricks	Talent	May 16	October 9	7¾	5¾	No	13.0	5.2	18.2	64.1	20.3
1815½	W. W. Estes	Talent	May 10	October 9	7	5	No	12.5	4.5	17.0	67.0	18.3
1816	E. P. Bennett	Medford	April 15	October 10	10¾	6½		11.7	3.8	15.5	55.0	21.4
1817½	M. E. Dixon	Applegate	May 15	October 11			No	12.5	2.9	15.4	67.0	18.6
1824	I. A. Merriman	Medford	April 19	October 15	7½	4½	No	11.5	3.6	16.1	63.0	18.0
1825	A. A. Porter	Grave						13.2	3.6	16.8	67.0	19.5
1826	J. W. Smith	Eagle Point	May 10	October 20	9	5	No	10.5	4.1	14.6	65.0	16.2
1827	Noah Cornutt	Riddle	May 10	October 21	10	6	No	14.7	3.0	17.7	75.0	19.5
1828	E. A. Hendricks	Talent	May 16	October 21			No	15.2	3.2	18.4	74.0	20.5
1829	M. H. Tower	Oakland	May 9	October 27			No	7.8	4.7	12.5	60.0	13.0
1831	John Hall	Myrtle Creek						13.2			71.0	18.5
1816½	L. Oldenburg	La Grande	May 12	October 18			No	10.9	5.3	16.2	61.5	17.7
1830	H. A. Kerns	The Dalles	May 12	October 26	7	3	No	12.7	5.2	17.7	69.0	18.5
1811	K. J. Stackland	Cove	June 7	October 7	9	4	No	6.7	6.1	12.8	40.4	14.1
1818	Robert Jamieson	Milton	May 15	October 10	10	8	Yes	14.2	4.7	18.9	73.0	19.3
1819	G. DeGraw	Milton	May 15	October 10	8½		Yes	13.2	4.1	17.3	65.0	20.1
1807	L. B. Zell	Milton	Late	October 4	11	6	No	8.0	5.5	13.5	48.4	16.5
1320	G. Carmichael	Weston	April 20	October 9			Yes	14.9	4.5	19.4	72.0	20.5
1823	J. R. King	Weston	May 10	October	10	7	Fair	10.3	3.7	14.0	60.2	17.1

The results show that a fair quality of sorghum for the purpose of syrup manufacture can be produced in Jackson county and probably in certain parts of Umatilla county. Experience of growers in the former shows that in ordinary seasons the early varieties of sorghum will well mature, but in the latter locality there will be much uncertainty as to the maturing of the crop. Under the present condition it is impossible to estimate the cost of the crop and the profit realized from it, but the most reliable estimates show that the cost of the syrup, ready for market, does not exceed 30 cents per gallon. Mr. E. H. Davis of Table Rock, Jackson county, reports that from a little less than one-half an acre he obtained 56 gallons of syrup. W. W. Estes states that from one-fourth of an acre he obtained 22 gallons of syrup. I believe the field is worthy of further investigation.

ALKALI PLATS.

In the fall samples taken at different depths from the alkali plats at Milton, were received from Mr. McMinns, and were subjected to analysis to ascertain the effect of the treatment the year previous. The results of analysis showed that the plat in the original state contained 28,320 pounds of active alkali as sodium carbonate per acre to a depth of 36 inches, and the plat which was given the previous year's treatment, as shown in previous report, carried but 11,652 pounds active alkali per acre to a depth of 36 inches—a material improvement which would undoubtedly render the ground tolerant of some of the more resistant crops. In the spring both the treated and the untreated plat was seeded with wheat, barley, beets, and bromus inermis, but up to the time of this report Mr. McMinn had not sent in his report as to the results.

MISCELLANEOUS ANALYSES.

The following miscellaneous analyses have been made during the year, the results of which are recorded in the proper books of the department: Arsenic (1), boiler water (1), sugar beets (2), saccalin (1), limestone (3), minerals (1), gypsum (3), milk (1), mustard (1), clover hay (2).

WORK FOR THE FOOD COMMISSIONER.

During the year the State Food Commissioner has sent to this laboratory, under the state law, numerous articles for analysis: Jelly (8), butter (6), candy (1), maple syrup (1). Of these all but

one can of jelly proved to be adulterated, and three samples of butter proved to have been "processed." Twice I was called to Portland as a witness for the State in cases brought in connection with the above work.

WHEAT AND FLOUR.

Under the conditions which existed it was deemed best not to begin the contemplated analyses of the wheats with a view to ascertaining changes brought about through changes in climate and soil.

Under my direction, however, Mr. E. J. Lea, a post graduate student, undertook an investigation as to the chemical composition of Oregon flour with special reference to the gluten content. The results of this work, which were presented in a thesis, represent the most exhaustive study of the Pacific coast flour which has been made. The data is of much value both from a practical and scientific standpoint, and I recommend the publication in bulletin form.

BULLETINS.

During the year there were published by the station four bulletins, of which three were from this department. They are as follows: No. 59, Sugar Beet Experiments of 1898, December; No. 61, The Oregon Prune, March; No. 62, Miscellaneous Investigations, June.

The usual amount of correspondence has been conducted in the way of answering questions asked by farmers. This has been done partly by personal letters and partly through the columns of the press.

Respectfully submitted,

G. W. SHAW.

REPORT OF THE ENTOMOLOGIST.

President Thomas M. Gatch:

SIR:—I hereby present a brief report on the work of the department of zoology for the year ending June 30, 1900.

At the beginning of the year, in accordance with a plan approved by yourself and the Vice-Director, whereby the work in fungous diseases was transferred to this department, I decided to begin investigation on a disease of apple trees locally konwn as canker or dead spot, and which had caused an alarming amount of injury to orchards of the Pacific Northwest during the past few years. The

first part of the investigation, which related to the manner in which the disease looked upon the trees was conducted here at the college and in other orchards in different parts of the state,but on attempting to work up the fungus itself I found myself hampered by the dirth of mycological literature in our library. Through the hearty co-operation of yourself and the Vice-Director I obtained a leave of absence for the purpose of conducting this part of the investigation at Cornell University under the direct supervision of Professor G. F. Atkinson. I accordingly left here the last of June, 1899, and returned the last of December, being absent from Corvallis almost exactly six months. The results of my work during that time have been presented in popular form in bulletin number 60, of this station, entitled Apple Tree Anthracnose. The more technical portions of the work have been embodied in a paper which is soon to appear in the Botanical Gazette.

Certain problems relating to the means of distribution of the disease and the best means of controlling it, still require further investigation and for this purpose a small orchard has been planted in which the various experiments will be conducted at the proper time. It will probably take two and possibly three years to obtain definite results with this part of the work.

Before leaving for the east, extensive co-operative spraying experiments for the codling moth and apple scab and for brown rot of the prune, had been planned and partly carried out in the college orchard and in the orchards of Mr. Thomas Whitehorn, Mr. J. B. Irvine and Mr. D. C. Rose, all of whom very kindly placed their orchards at my disposal for the purpose. Owing to the almost total failure of the crop in all of these orchards last year, the experiments had to be abandoned after considerable work had been done.

Before leaving I had also planned certain experiments with various insecticide compounds, some studies on the codling moth and striped cucumber beetle and some spraying experiments with hop-lice. During my absence this work was placed in the hands of Mr. W. J. Gilstrap, a student assistant in the department, who carried it on energetically and very satisfactorily. Mr. Gilstrap, however, resigned before the close of the season, so that a portion of his results were inconclusive and the work is being repeated the present season.

The early outlook for prunes was so poor this season that the spraying experiments with brown rot were discontinued, but the co-operative work with the codling moth is being conducted in the orchards

of Mr. Whitehorn and Mr. J. B. Irvine as well as in the college orchard, and the work with hop-lice is being carried on in the yard of Mr. Norman Lilly.

In addition to the spraying experiments, the larger portion of the time of myself and assistant is occupied in making and recording the results of observations upon injurious insects, in attending to the correspondence of the department, and in work upon the collection. The following outline of work, presented to you at the beginning of the year will serve to show some of the lines of work which demand our attention, although it is but a partial list of the subjects that come up for consideration. Necessarily, the information collected regarding these various pests is more or less fragmentary each season, but something is being added each year to our knowledge of their habits, with the intention of ultimately gathering it together in bulletin form.

Outline of work, for the coming season, in the department of entomology and plant diseases:

1. *Apple Pests.*—The Codling Moth, The Apple Tingis, Three Apple Aphids, Bark Diseases, Apple Scab.

2. *Prune Pests.*—Bark Diseases, Prune Root Borer, Prune Twig Miner, Brown Rot, San Jose Scale.

3. *Hop Pests.*—Hop Aphis.

4. *Strawberry Pests.*—Sesia rutulans, Anarsia sp, Phoxopteris comptana, Heltica sp., Leaf spot.

5. *Garden Pests.*—Cucumber Beetle, Pea Weevil, Cabbage Butterfly, Cabbage Plutella, Root Maggots, Tomato Blight, Onion Cut Worms and Thrips,

6. Work with various insecticides.

7. Breeding Miscellaneous Insects.

8. Additions to and rearrangement of the collection.

Probably the most important entomological event of the year has been the spread of the Hessian Fly. This is the most important insect pest of wheat in the world. It was first called to my attention in this state by Mr. West of Scappose in December, 1897.

Last year it was reported from Vernonia and this season it has appeared as far south as Hillsboro in this state and at Lewisville, Washington. A short article on this important pest has been prepared for the Oregonian, and breeding cage observations are under way to determine the number of broods and the date of their appearance for this state. I have also to record this year the rapid

spread of the Bell Moth, in destructive numbers, the appearance near Portland of a serious strawberry pest, Otiorhynchus ovatus, a serious fungous disease of onions, Pernovpera schleideni, which has not hitherto been reported from this section, and a very widespread and unuasually destructive appearance of a cutworm, probably Foctua Clandestine.

During my absence in the east I was very fortunate in securing as an assistant Mr. Fred M. McElfresh, a graduate of the University of Illinois, and at the time an assistant inspector of orchards and nurseries. Although appointed as an instructor in the college department, Mr. McElfresh has taken hold of the station work with zeal and has devoted to it much of his time. I would therefore suggest that an increase of salary to be made from the station fund if possible, would be no more than a just recognition of his ability and energy.

Respectfully,

A. B. CORDLEY.

REPORT OF THE BOTANIST AND HORTICULTURIST.

Thos. M. Gatch, Director:

Dear Sir:—The work of this department for 1899-1900 has been largely in the nature of a continuation of that carried on the previous year. Referring briefly to the report of this department for the last year the following notes are upon the scheme of work then presented:

1st. The fruits obtained last year from cross-pollenating, while plump and apparently fertile, the stones or pits being fully formed, failed to germinate when planted; hence, no returns for this work. A common observation among horticulturists last year is to the effect that few cherries matured perfect seeds.

The change of the care of the grounds to other hands has practically discontinued the work of Section 10, Division 1 of the scheme of 1899 as proposed for this department.

The introduction of new varieties of fruit trees, vines and shrubs has been pushed ahead quite favorably this year there being some sixty odd varieties of apples, pears, plums, cherries and small fruits added to the collection. Most of these are of the more promising new varieties of the east and middle west. There has also been set out to the west of the original station orchard a collection of pedi-

gree trees, from the Rogers' nurseries. Though the plantings were made late in the season they are nearly all doing well. More shall be added next year.

The work of collecting seeds and plants of our native flora continues, and it is hoped that some suitable piece of the ground may be set aside for botanical garden purposes, where a small supply, at least, of running water may be had.

The problem of evaporation, as related to the prune, and the use and preservation of our second quality fruits are still most important questions before the department; and though some preliminary work was done last year it only resulted in proving conclusively that ordinary commercial evaporators are not suitable for conducting accurate experiments. Before these problems can be adequately and scientifically investigated an evaporating and preserving plant must be constructed by the institution for the purpose.

The work pertaining to the botanical survey is not being carried along as fast as we should like to have it, but owing to the fact that there are only a few persons in the state competent and willing to do such work at present no very rapid progress can come in this direction until a general interest is awakened in the matter. Still some considerable data are being gathered by various voluntary observers.

Material for bulletins on "The Grape in Oregon," "The Apple and its Culture," and "Our Small Fruits" is being brought together, as well as matter pertaining to our native trees and shrubs.

Many thousands of specimens have been added to the botanical collections during the year, and the department needs more and better facilities for keeping them. New herbarium accommodations should be provided this year.

NEW WORK.

An exhaustive experiment relative to tree protectors has been undertaken at the suggestion of the fruit growers' convention. So far only two kinds of protectors are in use. It is desirable to try others, especially of paper and fiber construction.

For experimental purposes, so far as amount and quality, etc., of the products are concerned, the present orchard and fruit garden are practically useless. It is quite impossible to keep the public from picking the fruit, thus destroying all possibility of keeping any reliable data regarding production, quality, etc. It is desirable that

a site of not less than 20 acres be selected for the purpose of making an ideal orchard, where students of horticulture may have an opportunity of studying the latest methods of pruning the various varieties, tilling, spraying for crops—not experimental work—harvesting, marketing and preserving our common hardy fruits; and also where tests of real value may be conducted between the various varieties.

The climatic conditions together with much other work made it quite impossible to carry on the work of cross-pollenation this year. This is the most promising field for the development of new and improved varieties of fruit and it is to be hoped that the work of the department can be so arranged during the spring term as to permit of carrying this work forward, though only partial results can be expected until several more of the better varieties of fruits blossom freely, as a result of age.

Respectfully submitted,

E. R. LAKE.

REPORT OF THE FLORICULTURIST AND GARDENER.

President T. M. Gatch, Director Experiment Station:

Dear Sir:—I have the honor of submitting the following report on Vegetable Gardening. By permission of the Vice-Director, Dr. Withycombe, about two acres of land situated directly north of the barn has been set aside for the purpose of testing varieties of vegetables. Seed for which has been sent here by the different seedmen and Department at Washington.

In the fall of 1899, one half acre was planted to three varieties of fall cabbage. But owing to the great number of slugs in the soil at the time the plants were eaten off in about three days, consequently the project was a total failure.

Three varieties of peas have been sown under different methods of cultivation of the soil, namely, cultivating the soil to a depth of 15 inches without manure. Then seed was sown on soil cultivated in the usual way, simply plowing the ground 8 inches deep. For this test the same variety was used for the three methods. But time will not permit to report fully as the crop has not fully matured.

Several varieties of onions have been sown but the outlook is not very good for those grown from seed sown in the open ground, but

those raised in boxes and set out show some signs of making good growth at the present time.

Parsnips have been sown in two ways; one by shallow cultivation of the soil and the other by deep cultivation and manure placed 15 inches deep. Plants on deep cultivated soil look much stronger and healthier than those sown on shallow soil.

Four varieties of Swiss chard have been received from the Department of Agriculture for testing. Each variety has been sown and is looking well. This is quite an old vegetable and has no particular merit as a vegetable with the general public. It is used principally for the decorating of flower border, as the foliage is very ornamental.

Seven varieties of Brocoli have also been received from the Department of Agriculture. The seed has been sown but is nearly a failure, as but few seed germinated. The seed was sown in the open ground in carefully prepared beds but still failed to germinate freely.

Broad beans, *Faba Vulgaris*, is a very common bean and is very much used in all parts of Europe, but has not yet been taken up by the people of Oregon. Four varieties of the above have been sown, but I do not look for any good results from them from the fact that the seed was received too late. To be successful, seed must either be sown in the fall, or very early in the spring; being perfectly hardy, the plant will withstand our winters, if we can only get seed for next year shall be doing well.

One variety of khiva winter muskmelons from the Department at Washington has been sown.

One variety of carrots from the same source. This so far has failed to germinate.

Three varieties of radish have been sown, namely, everlasting, summer, and long olapuka. All three have germinated well.

One variety of New Zealand spinach was sown but failed to mature plants.

One package of chicory has been sown and is looking well.

Four varieties of string beans from Naples have been sown and all are looking well at this date.

Five varieties of vegetable marrows have been sown and plants are showing well. This is simply another form of summer squash, as we may as well term them. U. S. Department of Agriculture.

One variety of millet seed was received from Barteldies & Co., Lawrence, Kansas, for testing, but so far the seed has not germinated, although sown on May 12th.

One variety of joint fruiting cucumber has been sown. Seed was received from U. S. Department of Agriculture.

Fourteen varieties of tobacco were sown in seed pan in greenhouse. All varieties except three did well. Two failed to germinate. The plants, as soon as large enough, were pricked out into flats or boxes and as soon as large enough to set out were planted in the open ground. This was done on May 5th. The cool weather retarded the growth of the young plants, but they have begun to show signs of making rapid growth since the weather has changed to warmer.

Seed of two varieties of cabbage have been sown in hills, but owing to the coolness of the season and the lack of proper fertilizer in the soil, the young plants are not making such good progress as I would like to see them make.

Respectfully submitted,

GEORGE COOTE.

REPORT OF THE BACTERIOLOGIST.

Dr. Thos. M. Gatch, Director of Experiment Station:—

Dear Sir:—I herewith submit a report of work done in my department during the past year.

The work on nitrifying germs in clover roots was continued, and I found that the largest number of nodules were produced on the clover roots from seed which had been treated with a coating of carbonate of soda. The clover was longer and had a far better root system. This was noticeable in the clay, white land, and red upland soils. That which had been treated with lime was not so good. The five-inch pots inoculated with one ounce of soil, taken from a field where vetches had grown, gave good results. This method of dipping clover seed in a saturated solution of sal soda with a small amount of glue will prove of great value to acidulous soil because it neutralizes the soil in the immediate vicinity of the young clover plant. The operation of treating the seed is very simple and inexpensive. Not only does it promote a better growth of clover, but it stimulates the growth of a much larger number of nodules on the roots, thus accumulating a greater amount of nitrogen through the nitrifying germs in the nodules.

A number of samples of clover seed have been treated with soda and sent to different parts of the state where clover had not been successfully raised. A number of samples of oats were treated with hot water, blue vitrol, Formaldehyde and sulphate of zinc of different strengths to prevent smut. Two hundred samples of wheat were tested in germinating pans to determine the value of wheat for seeding after the wheat had become wet in the shock or otherwise. It was found that after clipping the sprouts close to the kernel 76 per cent would germinate seven times. One hundred kernels, sprouted in the same manner, were dried at a temperature of about 70 degrees and all the dried sprouts rubbed off with the fingers. After this treatment only 7 per cent sprouted the second time.

In bacterial diseases of fowls there were sixteen outbreaks investigated, of which were found five cases of avian tuberculosis, in one instance fifty chickens had died of this disease, the others ranged from one to five deaths; one case of diptheretic roup from which there were about thirty deaths; one case of catarrh, heavy loss of young chicks and turkeys reported.

A careful investigation of incubator chicks was made and it was found that the enormous loss was due to severe colds contracted by the chicks in the brooders, especially in brooders heated by kerosene lamps. The many chicks dissected showed no evidences of bacterial disease and the only leisons were highly congested lungs.

An experiment with the treatment of catarrhal roup by the use of permanganate of potash in one-half per cent solution was very successful.

In bacterial diseases of domestic animals one outbreak of swine plague was discovered. Numerous samples of diseased animal organs from different parts of the state were examined but no pathogenic germs of infectious or contagious diseases were found.

The experiment of testing the pathogenesis of avian tuberculosis in lower animals was not fully tested for lack of guinea pigs, which could not be procured in sufficient numbers at the time.

An experiment with the bacterial diseases of milk was begun on an extensive scale and will be continued next year.

Respectfully submitted,

E. F. PERNOT.